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Karyology of Three Indian Lasiocampid Moths (Lepidoptera)

P. K. Mohanty and B. Nayak

Department of Zoology, B. J. B. College, Bhubaneswar, Orissa, India

Abstract. Chromosome studies on three species of Lasicocampid moths (*Crinocraspida torrida, Dendrolinus hyrtaca* and *Taragama siva*) revealed *n* of 26, 31 and 31, respectively. In both size and morphology, the chromosomes were almost identical. Sex chromosomes, if any, remained unidentifiable. The details of chromosome morphology and behaviour during meiosis are discussed.

Introduction

The Lepidoptera constitute a major group of insects of over 200,000 species. Only a small number of these have been cytologically investigated so far. Most studies have been concerned with the chromosomes of Macrolepidoptera, particularly butterflies. The Microlepidoptera are moths which comprise the majority of species, but have been little studied. To date very little work has been done on Indian species of Lepdioptera (Gupta, 1964; Rishi, 1973, 1975; Nayak, 1975). Of the family Lasiocampidae, chromosome counts of only four species have so far been reported (Rishi, 1973; Nayak, 1975). The present paper deals with the chromosome studies of three species of Lasiocampid moths, two being reported for the first time.

Materials and Methods

The larvae were collected from their respective host plants (see Table 1) and reared in cages. Testes of late larvae (5th instar) and early pupae were found suitable for cytological preparations. Freshly dissected testes were fixed in aceto-alcohol (3:1) overnight and smears were made on pre-warmed albuminised slides using 45% acetic acid. The stain used was Heidenhains' Iron Haematoxylin.

Observations and Discussion

Crinocraspida torrida: 2n=52. The spermatogonial metaphase chromosomes were exceedingly small, homomorphic and spherical, and were not differentiable into autosomes and sex-chromosomes. The early meiotic stages were ill-defined due to the diffuse nature of the chromosomes. At pachytene, they formed shorter and thicker bivalents though still not countable. At Diplotene, diakinesis revealed chiasma bearing forms like

Table 1

Collection Data for Study Material

Name of Species	Food Plant	Place of Collection	Period of Collection
Crinocraspida torrida Moore	*Terminalia* sp.	Bhubaneswar	Dec., 1976
Dendrolinus hyrtaca Cramer	*Zizyphus jujuba*	Bhubaneswar	Aug., 1976
Taragama siva Lef.	*Eugenia jambolana*	Bhubaneswar	Sept.-Oct., 1975

'cross', 'V', rod- and dumb-bell-shaped bivalents, many of the chiasmata being terminal or near terminal. Metaphase I cells invariably showed 26 bivalents. The chromosomes were oval in polar view and dumb-bell-shaped on an equatorial plane. A few polyploid cells with almost double the number of metaphase I bivalents were also observed. Metaphase II showed 26 univalents.

Dendrolinus hyrtaca: 2n=62. Metaphase I cells showed 31 bivalents. In some plates, however, one of the bivalents appeared to be deeply stained while in two other plates almost all the bivalents had undergone early resolution, the partners of each bivalent lying in close proximity to each other without any actual contact. In a good number of plates, twice the number of normal bivalents were encountered. At anaphase I, a pair of small deeply stained equal-sized bodies were visible on equatorial region of the spindle when all others had already reached their respective poles. Metaphase II showed 31 univalents.

Taragama siva: 2n=62. Metaphase I cells showed 31 bivalents. Variation in number by one more or one less was marked in a number of cells. This might be due to precocious separation of the partners of a bivalent or fusion of two bivalents. In some abnormal metaphase I cells, many univalent chromosomes were observed along with some bivalents. The univalents lay a little apart from each other but in homologous pairs. This configuration much before onset of anaphase I must have been due to non-pairing or weak pairing of homologues. In anaphase I, the majority of dividing cells showed homologues of one bivalent to trail behind the rest during their anaphasic movement towards the respective poles. Such lagging behaviour even could be followed up to telophase. Metaphase II showed 31 univalents, confirming the haploid complement for this species.

Of the three species chromosomally examined during this study, two of them, *D. hyrtaca* and *T. siva*, have a base number n=31 which is in close correspondence with the modal haploid number of the family Lasiocampidae

and with that of Lepidoptera in general (Kernewitz, 1915; Beliajeff, 1930; Saitoh, 1970; Robinson, 1971; White, 1973; Ennis, 1976). The third species, *C. torrida*, has a haploid number n=26 which is quite different from the modal number. Twelve members of the twenty species of this family which have been cytologically examined so far have the haploid number 31. The occurrence of low haploid numbers like 28 in *Trichiura crataegi* (Federly, 1945), 26 in *Trabla vishnu* (Nayak, 1975), 25 in *Malacosoma indica* (Rishi, 1973) and 26 in *C. torrida* (present report) indicate a trend towards evolution of lower chromosome numbers, and chromosomal fusion rather than dissociation appears to have played the main role in the process. The lagging anaphasic movement of a pair of elements in *Dendrolinus hyrtaca* and *Taragama siva*, perhaps the homologues of a bivalent, points to their sex-chromosome (XX pair) nature.

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Fig. 1. Metaphase I of *Crinocraspida torrida*. Fig. 2. Metaphase I of *Dendrolinus hyrtaca*. Fig. 3. Metaphase I of *Taragama siva*.